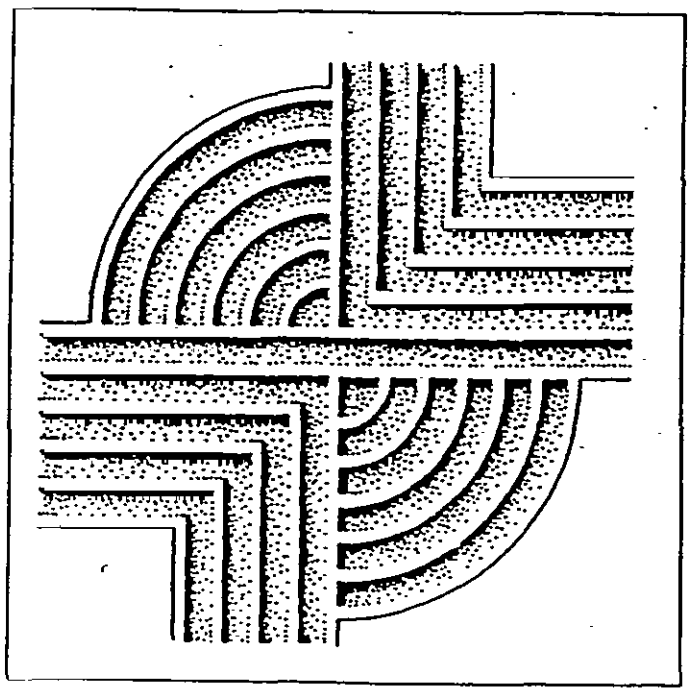
ETHNOBOTANICAL ANALYSIS OF SAMPLES FROM THE CHARLESTON CENTER SITE, CITY OF CHARLESTON, SOUTH CAROLINA



RESEARCH CONTRIBUTION 15

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Chicora Research Contribution 15

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Introduction

The Charleston Center site, situated on the city block bounded by Hasell Street to the north, Meeting Street to the east, Market Street to the south, and King Street to the west in downtown Charleston, has been subjected to a series of archaeological studies beginning in 1978 as a result of federal historic preservation compliance procedures. An initial reconnaissance survey was conducted by Cosans and Henry (1978) and a documentary study was prepared by The Charleston Museum (Herold and Thomas 1981). The first extensive archaeology was conducted in 1981 by Honerkamp et al. (1982) at which time 2690 square feet of the site area were investigated (a 1.4% sample). Both Cosans and Henry (1978) and Honerkamp et al. (1982) emphasized the importance of privy features to providing sealed, datable archaeological contexts. Additional work was conducted at the Charleston Center site by The Charleston, under the direction of Herold and later, in 1985, under the direction of Zierden (Zierden et al. 1986). This work examined an additional 1000 square feet of the site (or 0.5% of the site area). This present study examines ethnobotanical materials collected by The Charleston Museum during its two seasons of investigations.

As a result of this previous work, the Charleston Center city block is clearly the most thoroughly studied archaeological site

in the City of Charleston, although the employed techniques have not been completely consistent and several problems have plagued the historical documentary studies (see Zierden et al. 1986 for a more complete discussion). The most significant limiting factors, as far as this ethnobotanical study is concerned, are (1) the failure of Honerkamp et al. (1982) to collect ethnobotanical samples from their original work, (2) the failure of The Charleston Museum excavations by Herold to routinely collect ethnobotanical samples (several features were sampled by Zierden, but no consistent program or collection procedures were used by Herold), (3) the failure to identify features having a high probability of yielding well preserved ethnobotanical remains during the 1985 studies, and (4) the inability to correlate the archaeological remains with identifiable households or families. These factors have worked to reduce the materials available for study and severely limit the conclusions which may be drawn from the available data.

Some historical archaeologists suggest that when faced with the inability to correlate archaeological remains with identifiable households or families it is appropriate to "salvage" the data by considering it to represent the "average" of human behavior which took place at the site or in the neighborhood. This approach does have the attractive feature of allowing the study and use of thoroughly mixed proveniences, which would otherwise be difficult or impossible to interprete, although the conception of what this average represents is likely to be rather vague or ambiguous. While it is likely that the "average" most often represents the archaeological "mean" rather than the "median," this can be affected

by the preservation of archaeological remains, archaeological sampling techniques, and the social, cultural, and economic homogeneity of the neighborhood both temporally and spatially. While the archaeological "averaging" of complex sites and their data may be used to order the complexity of reality, it may present vastly different views of that reality, depending on how the technique is used. Consequently, the "averaging" concept is reduced in usefulness if we are uncertain what is being averaged and how the average is being derived.

The Charleston Museum research at the Charleston Center site examined four topics: spatial patterning of the remains, artifact patterning and site function, socioeconomic status of the block's residents, and evidence of subsistence strategies. A well designed and carefully implemented ethnobotanical study could possibly contribute to each of these research themes, albeit with varying intensity and accuracy. For example, examination of the spatial arrangement of ethnobotanical remains (including structural wood, fuel wood, and food remains) could contribute to a better understanding of the changes which took place in the block's structural and functional composition over time. Charcoal, as an artifact of human activities, may be expected to reveal information on site function through time and space. Ethnobotanical remains, such as plant foods and possibly even fuels, may be socioeconomically sensitive. Clearly, ethnobotanical remains may contribute to a more complete understanding of the historic diet (Reitz and Scarry 1985; Smith 1985; Zierden and Trinkley 1984). Unfortunately, prior to the 1985 season, the collection of ethnobotanical data and its

integration into the research design were not pursued. While soil samples were collected in 1985 specifically for flotation, few features capable of making major contributions to ethnobotanical research were encountered. As a result, this study is able to offer only tentative suggestions regarding subsistence, site function, and evidence of status.

In addition to the problems specific to the Charleston Center site which have limited research, there are certain limitations inherent in the ethnobotanical record. First, it is primarily the durable, inedible portions of plant foods (the plant food remains) which are available for study. Second, the availability of plant food remains for study will depend on food preparation techniques, disposal patterns, site preservation, and the efficacity of the archaeological collection techniques. Third, the quantity of plant food remains and the types present bear no clear relationship to their dietary contribution. Succintly stated, not all plant foods will be represented in the archaeological record and those present will not necessarily reflect their actual popularity in the diet. For example, foods such as potatoes or onions, because they have no durable remains and because of their normal preparation, are rarely found at archaeological sites. Further, the frequency of durable seeds must be cautiously interpreted, both in terms of popularity (a peach has a single seed, while a grape may have from two to six seeds and a raspberry may have 100 seeds) and dietary contribution.

Previous work in Charleston has resulted in the examination of ethnobotanical remains from six sites which span the eighteenth

and nineteenth centuries: McCrady's Tavern (Trinkley 1982), First Trident (Trinkley 1983a), Lodge Alley/38 State Street (Trinkley 1983b), the Beef Market (Trinkley in Calhoun et al. 1984), the Aiken-Rhett house (Trinkley 1986a), and Gibbes house (Trinkley 1986b). This work has examined 39 flotation samples from a variety of archaeological strata and features, but none from privy contexts. Wood charcoal from these sites ranged from 55.6 to 100% of the float samples. Evidence of subsistence activities has been difficult to identify in these previous studies and plant food remains have been limited to corn (Zea mays), grape (Vitis sp.), peach (Prunus persica), hickory nut (Carya sp.), walnut (Juglans sp.), and possibly acorn (Querus sp.). Some evidence of site environs has been provided by "weed" seeds from the Brassicaceae, Poaceae, and Fabaceae families, as well as vetch (Vicia sp.), wildbean (Strophostyles helvola), and paspalum (Paspalum sp.).

Identification of wood charcoal has revealed that while pine (Pinus spp.) was the most common fuel wood during both the eighteenth and nineteenth centuries, other woods being burned included oak (Quercus spp.), hickory (Carya spp.), maple (Acer sp.), elm (Ulmus sp.), cedar (Juniperus virginiana), and ash (Fraxinus sp.). Very small amounts of tupelo (Nyssa sp.), river birch (Betula nigra), gum (Liquidambar sp.), persimmon (Diospyros virginiana), walnut (Juglans sp.), and willow (Salix sp.) have also been found in Charleston samples. It is not surprising that wood species diversity in the archaeological record decreases from the eighteenth into the nineteenth century; Weir remarks that:

> [h]auled in from a distance, fuel was becoming increasingly expensive in Charles Town by the end of the Colonial period. Some residents therefore burned imported coal, and many complained about the price of wood (Weir 1983:44).

Very small quantities of coal have been found in Charleston deposits dating to the 1720s, although it does not become common until the late eighteenth or early nineteenth century. Reese, in the mid-nineteenth century, remarked that:

> [wood] consumes quickly, and requires often renewing; on this account it is expensive, and the labor necessary to prepare it is also very considerable. . . . [Coal's] superiority over every other combustible, for domestic as well as many other purposes, is now generally acknowledged (Reese 1847:116-119).

In fact, in Britain by the mid-nineteenth century only the poorer classes continued to use wood and the archaeological samples from Charleston clearly reveal the popularity of coal among wealthy Charlestonians. Coal functioned not only for heating (Reese 1847: 93-98), but also for cooking when used with a stove (Reese 1847: 808-820). Coal, however, required the use of wood kindling, so that even if both heating and cooking were primarily through the use of coal, wood remained essential (Reese 1847:120). By the

mid-nineteenth century there were at least three Charleston coal yards, including H.F. Baker at 173 East Bay, J.S. Ryan at the corner of East Bay and Fitzsimon's Wharf, and P.W. Knapp at Cumberland near Church Street. Prices ranged from $6 to $7 per ton and both caking or bituminous and anthracite coals were available.

Procedures and Results

During the 1985 excavations at the Charleston Center site personnel of The Charleston Museum handpicked charcoal from the excavation units and the 1/4-inch dry screening. A series of 23 such samples were collected and submitted for analysis. These samples represent primarily fuel or structural woods, both carbonized and noncarbonized, many pieces of which were large enough to allow identification. These handpicked samples were examined under low magnification (7 to 30x) with the larger fragments of wood charcoal, where possible, identified to the genus level, using Chicora Foundation comparative collections, Panshin and de Zeeuw (1970), and Koehler (1917). Wood charcoal samples were broken in half to expose a fresh transverse surface. The results of this analysis are shown in Table 1, which is organized by provenience.

Wood species diversity is quite low, as was expected from the largely nineteenth century collection (only Feature 145 represents a pre-nineteenth century deposit). Pine, present in all 23 samples, is dominant in 86.9% (N=20). Other wood species include only oak, maple, and hickory, in order of declining abundance. Coal is found in 14 of the 23 samples (60.9%) and has

		Pinus sp.	*Quercus* sp.	*Acer* sp.	*Carya* sp.	UID wood	Coal	Seeds
Feature 145,	lv 1	p	t	t			+	
	lv 2	+	t			t	t	
	lv 3	+	t				t	
	lv 4	+	t			t	t	
	lv 5	+	t				t	
	lv 6	+	t			t		
	profile	+					t	
Feature 147		+						
Feature 148,	zn 1	+						
	zn 2	+						
	zn 3	+					t	
Feature 149,	zn 1	+	t	t			t	
	zn 2	+		t				
	zn 1/2	+	t				t	
	zn 3	p	+		t	t		
	zn 4	+	t	t	t			
Feature 150,	lv 1	+	p				t	
	lv 2	+	t				t	
	trow	p					p	
Feature 153,	N½	+		t		t	t	1 *Vitis*
	S½	+		t				
Feature 155		+						
Feature 156		+			t		t	

+ = abundant; p = present; t = trace

Table 1. Analysis of handpicked charcoal samples

probably been selected against in the collection process. A single provenience (Feature 153), an early nineteenth century privy, produced a single noncarbonized grape seed in the trowelings. Two samples, from Features 147 and 155, have yielded large quantities of both carbonized and noncarbonized pine wood. Zierden et al. (1986) have interpreted these to represent either "natural traps" which collected architectural remains or foundations, although in either case, they apparently provide "tangible evidence of the major fires which impacted the block in the 1830s" (Zierden et al. 1986:73).

This conclusion is supported by the ethnobotanical data as both samples clearly represent burned structural remains. In spite of the periodic fires that ravaged Charleston and colonial ordinances which required fire-proof construction, many structures, particularly smaller buildings, continued to be built of wood, even into the the early nineteenth century. Colonial residents frequently complained of the costs associated with brick construction (Hollings 1978:38-39). Pine was the primary wood used in this construction because of its abundance, strength, and ease of working.

In addition to the handpicked samples, a series of 19 flotation samples were submitted. These samples, collected from features excavated by Herold and Zierden, were floated by Charleston Museum personnel using a simple system where the dried feature soil is gradually added to a large tub of water. The water is stirred and a scoop is used to collect material floating to the surface. The recovery rate of this system has not been tested, although it has been consistently used in the discussed City of

Charleston research. Smith notes that this technique results "in the mechanical breakage of some of the charcoal" (Smith 1985:108).

Of the 19 float samples submitted, which represented 12 features, time and budgetary constraints allowed the investigation of 10 samples from eight features, selected by Zierden on the basis of associated artifacts and archaeological context. All of the collections date to the nineteenth century and, for the first time, eight privy features were available for investigation. The remaining two flotation samples, Feature 132 and Feature 149, represent a shallow refuse filled pit of indeterminate function and a natural "refuse trap" adjacent to a brick foundation, respectively. These samples are contexturally and functionally similar to previously investigated Charleston collections which have yielded few subsistence remains.

The flotation samples were prepared in a manner similar to that described by Yarnell (1974:113-114) and were examined under low magnification (7 to 30x) to identify plant foods and plant food remains. Remains were identified on the basis of gross morphological features and seed identification relied on Martin and Barkley (1961), Montgomery (1977), and Schopmeyer (1974). The results are provided in Table 2.

It may be observed that the privy features yield larger quantities of seeds than the pits or natural depressions. This observation may explain why previous ethnobotanical studies in Charleston have produced so few results. Privies apparently served as convenient recepticles for the disposal of large quantities of floral remains. It has been observed that seeds from the

Provenience	Amount Floated	Wood Charcoal wt	Wood Charcoal %	Uncarb Organic wt	Uncarb Organic %	Other wt	Other %	Small Bone wt	Small Bone %	Seeds wt	Seeds %	Total Weight
Privies												
Fea 100, in pot	2 gal.	11.83	94.0	0.68	5.4	0.05	0.4[a]			0.02	0.2	12.58
Fea 115, Lv E	4 gal.	6.31	51.4	0.13	1.1			5.56	45.6	0.27	2.2	12.27
Fea 124	2 gal.	7.07	92.7	0.25	3.3			0.27	3.5	0.04	0.5	7.63
Fea 130, Lv 2	6 gal.	8.58	85.6	1.00	10.0	0.12	1.2[b]	0.24	2.4	0.08	0.8	10.02
Lv 3	?	1.29	87.8	0.07	4.7					0.11	7.5	1.47
Fea 139	2 gal.	9.22	87.8	0.71	6.8			0.30	2.8	0.27	2.6	10.50
Fea 153, S½	15 gal.	20.06	97.1	0.51	2.5			0.05	0.2	0.03	0.1	20.65
N½	25 gal.	16.41	94.6	0.34	2.0			0.58	3.3	0.02	0.1	17.35
Pits												
Fea 132	2 gal.	6.58	98.4	0.07	1.0			0.04	0.6			6.69
Fea 149, Zn 2	15 gal.	15.93	99.3	0.09	0.5			0.03	0.2	t	t	16.05

[a]shell [b]glass, carbonized twine

t = trace (less than 0.01 g)

Table 2. Flotation sample components, weight in grams.

processing of fruit preserves and jellies were discarded in privies (The Cultural Resource Group 1985:240) and smaller quantities were probably disposed of as normal kitchen refuse. In addition, a number of seeds with hard, impermeable seedcoats may pass through the digestive system relatively intact and will be found in privy contexts as a result of defecation. These seeds, while noncarbonized, are preserved because of the moist, sealed context; the addition of lime to the privy may actually assist in seed preservation by dissuading insect and fungal attack.

Recovered seeds include fleshy fruits, vegetable, and "weedy" plants. The former two categories probably represent the by-products of subsistence activities, while the latter category provides some evidence of the "micro-environmental setting surrounding the outhouse" (The Cultural Resource Group 1985:244). Fruits evidenced by the Charleston Center samples include raspberry (Rubus sp.), strawberry (Fragaria sp.), elderberry (Sambucus sp.), blueberry (Viccinium sp.), cherry (Prunus sp.), pear (Pyrus communis), and grape. The single vegetable is the bean (Phaseolus vulgaris). "Weedy" plants are evidenced by seeds of bedstraw (Galium sp.), chenopod (Chenopodium sp.), maypops (Passiflora incarnata), violet (Viola sp.), knotweed (Polgonum sp.), and an unidentified grass (Gramineae) (Table 3).

Discussion

The woods discovered in the Charleston Center collection are similar to those previously identified from Charleston sites. Species diversity is low, probably reflecting the depletion of

	Raspberry	Strawberry	Elderberry	Blueberry	Cherry	Pear	Grape	Bean	Bedstraw	Chenopod	Maypops	Violet	Gramineae	Polygonum	UID	Total Weight (in grams)
Fea 100, in pot	1	41							24						2	0.02
Fea 115, Lv E	145	20				1	15				1				3	0.27
Fea 124	7	19									1				1	0.04
Fea 130, Lv 2	9	58	4		1								1		2	0.08
Lv 3	5	91					2								3	0.11
Fea 139	4	6		1				3							6	0.27
Fea 153, S½	1	10							7	1		1			3	0.03
N½	2	5	3							1				1	1	0.02
Fea 149, Zn 2															2	trace

Table 3. Seeds recovered from flotation samples.

forest resources in the vicinity of the town. The most common wood from these collections is pine, which may indicate a preference for this species, or more likely, that there were large areas of second growth pine in the Charleston area by the nineteenth century. Two other recovered woods, oak and hickory, may be found on either dry or moist soils, depending on the species, but the maple is most likely red maple (Acer rubrum), which is found in low, rich woods. Since red maple, because of its poor heat yield, is unlikely to have been intentionally sought as a fuel wood (Graves 1919:29), its use in the early nineteenth century may provide evidence of the clearing of low-lying land for the planting of sea island cotton on plantations near Charleston.

All of the fruits recovered from the Charleston Center site could have been grown locally; the absence of exotic, or imported, fruits may provide an indication of the middling status of the Charleston Center block in the nineteenth century, or it may simply be a result of the small sample size.

While it is not possible, based on the ethnobotanical record, to suggest the use of most of the fruit specimens in these samples, historically fruits were used to produce wines and cordials; jams, marmalades, and jellies; and vinegar. Fruit was preserved by boiling or being candied and considerable quantities were eaten fresh (Reese 1847:629-646, 668-669, 792, 796-780). Reese states that:

> [n]o class of substances employed as food varies more in their dietetic qualities than fruits, which, though extremely salubrious when used

> judiciously, are frequently injurious, particularly to the invalid. It is essential, in order to have a just view of this subject, to discriminate accurately between different species, the state of ripeness, the time and circumstances under which the fruit is eaten, as well as the constitution of the consumer. There are three modes in which fruits may be used as food: in a crude state, dried, or prepared by the art of cooking (Reese 1847:497).

Culpepper in the early nineteenth century also discussed the medicinal properties of fruits such as pears, strawberries, cherries, and blueberries, assigning to them certain curative powers (Culpepper 1981).

Raspberries, if locally grown, were a popular fresh fruit. They were also:

> much used in tarts, and jams, ices, &c.[,] delicious wine, . . . raspberry brandy and raspberry vinegar (Reese 1847:514).

Strawberries were considered "nutritious, and very wholesome, and [might be] safely eaten by gouty and rheumatic patients who have been forbidden the use of other fruit" (Reese 1847:514). Elderberry was used extensively for the production of wine (Reese 1847:515), while the blueberry was seldom cultivated, but was used in tarts or

made into jellies (Reese 1847:515). Reese comments that "next to the pineapple, grapes . . . have always been considered the most delicious fruit for dessert" (Reese 1847:506) and the grape was considered especially nutritious. Reese (1847:507) recommended grapes be eaten with bread as a working class breakfast. Cherries were a favorite fruit, being used for pies and tarts, and to produce brandy and wine (called Kirschevasser) (Reese 1847:502). By the mid-nineteenth century there were over 150 varieties of pears and they were considered a good "table fruit" (Reese 1847:499).

The only vegetable specimens identified in the Charleston Center collections are three examples of kidney beans, all of which are carbonized. Beans were considered to be very nutritious and were almost exclusively boiled as a separate dish by nineteenth century cooks (Reese 1847:478, 895). While French beans (i.e., green beans) were preserved by pickling, kidney beans were usually preserved by drying, usually by being "spread upon the floor of an oven or kiln" (Reese 1847:792). It is possible that during this drying process the recovered beans were carbonized.

The last category, that of "weedy" plants, includes species which are not likely to have been subsistence related, but which probably represent accidental inclusions in the feature fill. They are likely to be indicative of the micro-environment of the yards around the block's structures. Bedstraw, which fruits from April through August, may be found in wet areas, in clearings, and in waste-places (Radford et al. 1968:984). Maypop, a herbaceous climbing and trailing vine, is common to open fields and produces a fleshy fruit from July to October (Radford et al. 1968:734). Both

knotweed and chenopod, annual or perennial herbs found in disturbed habitats and on rich soils, fruit from June until the first frost (Radford et al. 1968:407-409, 418). The violet is a perennial or annual herb which may fruit from March through June. A variety of species are found wild and pansies were a common nineteenth century bedding plant (Favretti and Favretti 1978:164). The plants are found in disturbed habitats and on moist soils.

The Cultural Resource Group (1985:244) has suggested that the low recovery of species such as polygonum in urban privy contexts is evidence that "human intervention" has removed these nuisance plants from the yard. Given the low occurrence of fruit seeds in the privy samples, in spite of the abundance of fruit in nineteenth century diets, it seems unreasonable to equate the rarity of weed seeds from a closed or sheltered privy context with the presence of human intervention. While it may be reasonable to assume that some attempt was made to periodically cut down weeds in order to reduce the rodent and reptile populations, the presence of any "weed" seeds in ethnobotanical collections from privies suggests that the rear yards were frequently overgrown and unkemp, not unlike many of the commercial areas in the city today.

Summary

The Charleston Center ethnobotanical collection provided samples from privy contexts, as well as open feature samples similar to those previously studied from Charleston. The privy samples have yielded subsistence information lacking from previous investigations. Fleshy fruits are abundant, with seven genera being

represented. Previous Charleston investigations have documented the use of an eighth species (the peach). The Charleston Center flotation samples have yielded only one vegetable -- beans -- although previous work has identified evidence of corn and wheat (Triticum aestivum). Unpublished research from the waterlogged proveniences at the Atlantic Wharf site in Charleston has also documented the use of watermelon (Citrullus vulgaris), squash (Cucurbita spp.), and peanuts (Arachis hypogaea). Finally, a variety of nuts, including hickory, walnut, and acorn, have been found in various features, although none suggest extensive use in the nineteenth century. The work conducted to date reveals that privy and waterlogged features are more likely to yield significant subsistence data than are open features, such as pits or zone proveniences.

The ethnobotanical remains from the Charleston Center site have failed to yield specialized remains such as found at the craft-related commercial 38 State Street site. The Charleston Center collection appears relatively domestic, although the privy samples do not reveal evidence of the large scale food processing activities which might be expected at "intensive" domestic sites. This observation, however, must be offered with caution, based on the small samples available for study.

These investigations have revealed evidence of exclusively structural remains in several features, assisting feature interpretation. The work has also provided some information on the use of coal and wood, supporting previously gathered evidence that not only does species diversity decline in the nineteenth century, but

also that wood as a fuel is gradually replaced by coal in the first half of the century.

Status in the ethnobotanical record may be indicated by the presence or absence of certain high status foods such as cantaloupe(The Cultural Resource Group 1985:240) and possibly wheat (Trinkley 1986b). While the types of fuel woods being burned seem to be related more clearly to availability than status, it is likely that the use of coal in the late eighteenth and early nineteenth centuries was largely confined to the wealthy. The absence of exotic foods in the Charleston Center collection, while quite possibly related to sample size, may be indicative of the middle class neighborhood. Likewise, coal (while almost certainly underrepresented) does not appear as common in the middle status commercial-residential Charleston Center neighborhood as at sites such as the high status Gibbes residence in the more wealthy residential section of Charleston.

The Charleston Center site underscores the necessity for ethnobotanical studies to be integrated into the research designs of historic sites. Features offer better sources of plant foods than midden and non-midden proveniences, but privies and waterlogged deposits seem to offer the best opportunities for the recovery of subsistence data. The extremely variable quantities of charcoal per volume of soil (3,07 grams of charcoal per gallon of soil in Feature 115 compared to 0.69 gram of charcoal per gallon of soil in Feature 153) also suggest that rather than collecting standardized soil sample volumes for subsequent flotation, all samples should be processed in the field to ensure adequate ethnobotanical recovery

rates.

Sources Cited

Calhoun, Jeanne A., Elizabeth J. Reitz, Michael B. Trinkley, and Martha A. Zierden
1984 Meat in Due Season: Preliminary Investigations of Marketing Practices in Colonial Charleston. Archaeological Contribution 9. The Charleston Museum, Charleston.

Cosans and Henry
1978 Archaeological Assessment of the Charleston Center Project Area, Charleston, South Carolina. Ms. on file, Office of Revitalization, Charleston.

Culpeper, Nicholas
1981 Culpeper's Complete Herbal and English Physician. Reprinted. Printer Industria Grafica, Barcelona. Originally published 1826, J. Gleave and Sons, London.

Favretti, Rudy J. and Joy Putman Favretti
1978 Landscapes and Gardens for Historic Buildings. American Association for State and Local History, Nashville.

Graves, Henry S.
1919 The Use of Wood for Fuel. Bulletin No. 753. U.S. Department of Agriculture, Washington, D.C.

Herold, Elaine B. and Elizabeth Thomas
1981 History of the Charleston Center Area. Ms. on file, The Charleston Museum, Charleston.

Hollings, Marie Ferrara
1978 Brickwork of Charleston to 1780. Unpublished Master's thesis, Department of History, University of South Carolina, Columbia.

Honerkamp, Nicholas, R. Bruce Council, and M. Elizabeth Will
1982 An Archaeological Investigation of the Charleston Convention Center Site, Charleston, South Carolina. The Jeffrey L. Brown Institute of Archaeology, University of Tennessee, Chattanooga. Submitted to National Park Service, Inter-Agency Archaeological Services, Atlanta.

Koehler, Arthur
1917 Guidebook for the Identification of Woods Used For Ties and Timber. U.S. Department of Agriculture,

Forest Service, Washington, D.C.

Martin, Alexander C. and William D. Barkley
1961 Seed Identification Manual. University of California Press, Berkeley.

Montgomery, F. H.
1977 Seeds and Fruits of Eastern Canada and Northeastern United States. University of Toronto Press, Toronto.

Panshin, A. J. and Carl de Zeeuw
1970 Textbook of Wood Technology, vol. 1. McGraw-Hill, New York.

Radford, Albert E., Harry E. Ahles, and C. Ritchie Bell
1968 Manual of the Vascular Flora of the Carolinas. University of North Carolina Press, Chapel Hill.

Reese, D. M. (editor)
1847 An Encyclopaedia of Domestic Economy. Harper and Brothers, New York.

Reitz, Elizabeth J. and C. Margaret Scarry
1985 Reconstructing Historic Subsistence with an Example from Sixteenth-Century Spanish Florida. Special Publication Series 3. Society for Historical Archaeology, Pleasant Hill, Claifornia.

Schopmeyer, C. S. (editor)
1974 Seeds of Woody Plants in the United States. Agriculture Handbook No. 450. U.S. Department of Agriculture, Forest Service, Washington, D.C.

Smith, C. Earle, Jr.
1985 Recovery and Processing of Botanical Remains. In The Analysis of Prehistoric Diets, edited by Robert I. Gilbert, Jr. and James H. Mielke, pp. 97-126. Academic Press, New York.

The Cultural Resource Group
1985 Nineteenth Century Wilmington Households: The Christina Gateway Project. Louis Berger and Associates, East Orange, New Jersey. Submitted to The City of Wilmington, Delaware.

Trinkley, Michael
1982 Ethnobotanical Analysis of Specimens from McCrady's Longroom and Tavern, Charleston, S.C. In Archaeological Excavations at McCrady's Longroom, edited by Martha A. Zierden, pp. 101-109. The Charleston Museum, Charleston.

1983a Analysis of Ethnobotanical Remains, First Trident Site, City of Charleston. In An Archaeological Study of the First Trident Site, Charleston, South Carolina, edited by Martha A. Zierden, Jeanne A. Calhoun, and Elizabeth P. Pinckney, pp. 88-96. Archaeological Contribution 6. The Charleston Museum, Charleston.

1983b The Lodge Alley Ethnobotanical Samples: Evidence of Plant Use from Two Urban Sites. In Archaeological Investigations at Lodge Alley, Charleston, South Carolina, edited by Martha A. Zierden, Jeanne A. Calhoun, and Elizabeth A. Paysinger, pp. 112-119. The Charleston Museum, Charleston.

1986a Ethnobotanical Analysis of Samples from the Aiken-Rhett Site. In Outside of Town: Preliminary Investigation of the Aiken-Rhett House, edited by Martha Zierden, Jeanne Calhoun, and Debi Hacker, pp. 116-126. Archaeological Contributions 11. The Charleston Museum, Charleston.

1986b Ethnobotanical Analysis of Samples from the Gibbes House, City of Charleston, South Carolina. Research Contribution 11. Chicora Foundation, Columbia.

Weir, Robert M.
1983 Colonial South Carolina: A History. KTO Press, Millwood, New York.

Yarnell, Richard A.
1974 Plant Food and Cultivation of the Salts Cavers. In Archaeology of the Mammoth Cave Area, edited by P. J. Watson, pp. 113-122. Academic Press, New York.

Zierden, Martha and Michael Trinkley
1974 World Enough and Time: Ethnobotany and Historical Archaeology. South Carolina Antiquities 16:87-104.

Zierden, Martha, Elizabeth Paysinger, and Debi Hacker
1986 Salvage Excavations at the Charleston Place Site. Ms. on file, The Charleston Museum, Charleston.